1. Course: ENCP 260 - Introduction to the Mechanics of Solids
2. Credits and Contact Hours: 3 credits, 3 lecture hours per week
3. Instructor: Varies
4. Example Textbook: Mechanics of Materials, by R. C. Hibbeler, Pearson, 2017, Edition 10, ISBN: 9780134319650
5. Course Information
   1. Catalog Description: Concepts of stress and strain; stress analysis of basic structural members; consideration of combined stress, including Mohr’s circle; introductory analysis of deflection; buckling of columns.
   2. Prerequisites: ENCP 200 or ECIV 200 or EMCH 200, MATH 241.
   3. Substitute for ECIV 220 or EMCH 260
6. Course Goals
   1. Learning Outcomes. Students will be able to:
      1. Define and explain concepts of stress and strain for deformable solids
      2. Define and explain elastic mechanical properties of materials
      3. Analyze the deformation of solid bodies subject to axial, torsion, bending, and transverse shear loading
      4. Analyze combined loading situations and perform stress and strain transformations
      5. Apply mechanics of solids concepts to the design of beams, shafts and columns.
   2. Learning Outcomes (LOs) relation to ABET EAC Criterion 3 Student Outcomes

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| ABET EAC Criterion 3 Student Outcomes | LO1 | LO2 | L03 | L04 | LO5 |
| an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. | X | X | X | X | X |
| an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. |  |  |  |  | X |

1. Topics Covered

* Equilibrium of a Deformable Body
* Stress
* Normal Stress in an Axially Loaded Bar
* Allowable Shear Stress
* Strain
* Deformation
* Tensile Stress–Strain Diagram
* Hooke’s Law
* Strain Energy
* Poisson’s Ratio
* Shear Stress–Strain Diagram
* Saint-Venant’s Principle
* Elastic Deformation of an Axially Loaded Member
* Principle of Superposition
* Statically Indeterminate Axially Loaded Member
* Thermal Stress
* Torsional Deformation of a Circular Shaft
* Torsion Formula and Angle of Twist
* Shear and Moment Diagrams
* Graphical Method for Constructing Shear and Moment Diagrams
* Bending Deformation of a Straight Member
* Flexure Formula
* Shear in Straight Members
* Shear Formula
* Thin-Walled Pressure Vessels
* State of Stress Caused by Combined Loadings
* Plane-Stress Transformation
* General Equations of Plane-Stress Transformation
* Principal Stresses and Maximum In-Plane Shear Stress
* Mohr’s Circle—Plane Stress
* Plane Strain
* General Equations of Plane-Strain Transformation
* Material-Property Relationships
* Basis for Beam Design
* Prismatic Beam Design
* The Elastic Curve Beams and Shafts
* Slope and Displacement by Integration
* Columns Critical Load
* Ideal Column with Pin Supports

1. Document History

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